BOX-AND-WHISKER PLOT

A box-and-whisker plot can be useful for handling many data values. It shows only certain statistics rather than all the data. *Five-number summary* is another name for the visual representations of the box-and-whisker plot. The five-number summary consists of the median, the quartiles, and the smallest and greatest values in the distribution. Immediate visuals of a box-and-whisker plot are the center, the box (middle 50%), the lower whisker (lower 25%), the upper whisker (upper 25%), and the overall range of distribution.

(median)

The first step in constructing a box-and-whisker plot is to first find the *median,* the *lower quartile* and the *upper quartile* of a given set of data. Example: The following set of numbers represents the amount of marbles fifteen different boys own (they are arranged from least to greatest).

18 27 34 52 54 59 61 68 78 82 85 87 91 93 100

- First find the *median.* The median is the value exactly in the middle of an ordered set of numbers. (If you're finding the median in an ordered set with an even number of values, you must take the average of the two middle numbers.)

68 is the median

- Next, we consider only the values to the left of the median: 18 27 34 52 54 59 61. We now find the median of this set of numbers. Remember, the median is the value exactly in the middle of an ordered set of numbers. Thus 52 is the median of the scores less than the median of all scores, and therefore is the *lower quartile.*

52 is the lower quartile

- Now consider only the values to the right of the median: 78 82 85 87 91 93 100. We now find the median of this set of numbers. The median 87 is therefore called the *upper quartile.*

87 is the upper quartile

- You are now ready to find the *interquartile range (IQR)* also known as the Box. The interquartile range is the difference between the upper quartile and the lower quartile. In our case the IQR = 87 - 52 = 35. The IQR is a very useful measurement. It is useful because it is less influenced by extreme values. It represents the middle 50% of the values.

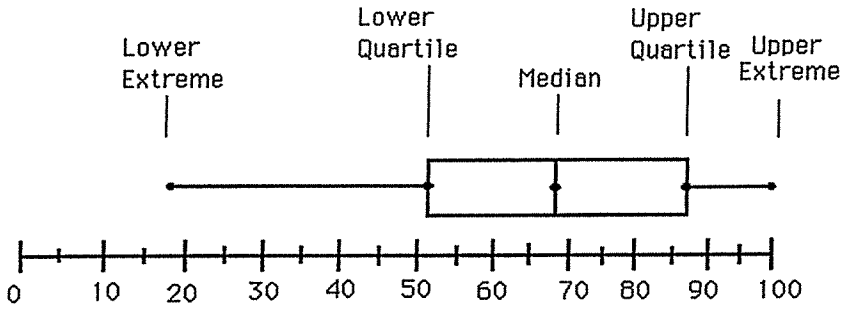
35 is the interquartile range

- You can also find the Lower Whisker by finding the difference between the lower quartile and the Lower Extreme. The Lower Whisker represents the lower 25% of the data.

- The Upper Whisker is the difference between the Upper Extreme and the Upper Quartile. The Upper Whisker represents the upper 25% of the data.

Now we begin to draw our graph on the back.

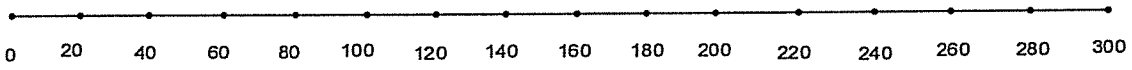
Put a dot above or below the number line to represent the five numbers you've found. Draw a box around the middle three. Connect the extremes to the box to form the whiskers. Draw a line in the middle of the box to show the median.



Find the Extremes, Quartiles, and Median of the set of data below which represents some bowling scores. Then make the box-and-whisker plot and answer the questions below.

Saturday Night Bowling Scores:

120, 215, 198, 115, 291, 95, 230, 144, 175, 270, 166, 193, 154, 225



1. If you join this league and normally bowl 225 you would be better than what percent of the other bowlers?
2. If you join this league and normally bowl 95 what % of the other bowlers are better than you?
3. If you join this league and normally bowl 184 what % of the bowlers are better than you?
4. If you join this league and normally bowl 144 you would be better than what percent of the other bowlers?
5. If you join this league and normally bowl 139 would you expect to win more games than you lose?